

This Page Is Inserted by IFW Operations  
and is not a part of the Official Record

## **BEST AVAILABLE IMAGES**

Defective images within this document are accurate representations of the original documents submitted by the applicant.

Defects in the images may include (but are not limited to):

- BLACK BORDERS
- TEXT CUT OFF AT TOP, BOTTOM OR SIDES
- FADED TEXT
- ILLEGIBLE TEXT
- SKEWED/SLANTED IMAGES
- COLORED PHOTOS
- BLACK OR VERY BLACK AND WHITE DARK PHOTOS
- GRAY SCALE DOCUMENTS

**IMAGES ARE BEST AVAILABLE COPY.**

**As rescanning documents *will not* correct images,  
please do not report the images to the  
Image Problem Mailbox.**



**Europäisches Patentamt**  
**European Patent Office**  
**Office européen des brevets**

(11) Publication number:

0 062 980  
A1

12

# EUROPEAN PATENT APPLICATION

(21) Application number: 82301478.2

(51) Int. Cl.<sup>3</sup>: A 47 B 57/04  
A 47 B 57/56

(22) Date of filing: 23.03.82

(30) Priority: 30-03-81 NZ 196660

(43) Date of publication of application:  
20.10.82 Bulletin 82/42

**⑧4 Designated Contracting States:  
AT BE CH FR IT LI LU NL SE**

(71) **Applicant: Worrallo, Anthony Charles**  
15 Sprott Road  
Auckland 5(NZ)

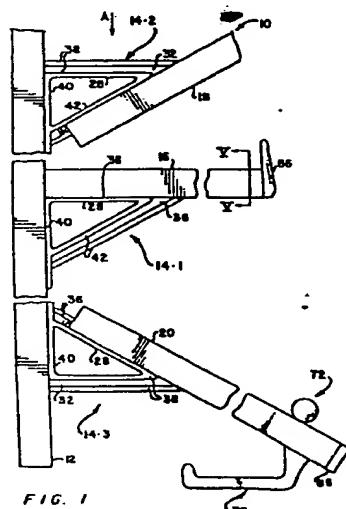
(72) Inventor: Worrall, Anthony Charles  
15 Sprott Road  
Auckland 5(NZ)

(74) Representative: Spall, Christopher John et al,  
BARKER, BRETTELL & DUNCAN 138 Hagley Road  
Edgbaston Birmingham B16 9PW(GB)

## 54 Shelf and display structures.

(57) A shelf and display structure in which horizontal or sloping members (16, 18, 20) are mounted on a vertical element (12) by locking structures (14.1, 14.2, 14.3). Each locking structure includes a pair of arms (28) which are generally triangular in side elevation. Each arm has three grooves in the outer face thereof. The inner face of each arm is generally flat and merges at one end with a rolling surface. When two arms are placed in co-operating relationship with their rolling surfaces in contact, the arms diverge from one another. In this condition they can be inserted into an elongate mouth of the element (12) and the outer ends of the arms can then be pressed towards one another, the arms rolling on their rolling surfaces until the flat rear faces are juxtaposed. During such rolling motion the element 12 is deformed by the arms so that frictional forces are created which resist movement of the locking structures along the element (12). A horizontal member (16) or sloping members (18, 20) can be mounted on the arms by co-operation between these members and either the horizontal or sloping grooves. Knobs, hooks or other devices can be mounted on the members (16, 18, 20) to enable articles to be displayed or, where the member is horizontal, it can support shelves.

062 980 A1



- 1 -

SHELF AND DISPLAY STRUCTURES

THIS INVENTION relates to shelf and display structures.

According to one aspect of the present invention there is provided a structure comprising first and second elements and a pair of arms, the first element including two spaced apart portions which together define a mouth, and each arm having a first face and an opposed second face, there being a first groove in each first face adjacent one end thereof which grooves receive said portions when the arms are located in said mouth with the second of said opposed faces thereof in juxtaposed relationship, the distance between the bottom surfaces of said first grooves being greater than the width of said mouth between said portions before insertion of the arms therein so that said arms hold said portions apart, said one end of each arm being bounded by a rolling surface which merges with said second face, said rolling surfaces enabling said arms to roll one on the other between a position in which said second surfaces are in juxtaposed relationship and a position in which said rolling surfaces are in engagement with said arms diverging from said one end, said arms being inserted into and removed from said mouth while in this diverging relationship,

- 2 -

second and third grooves in each first face, the second and third grooves of each first face being oblique with respect to one another and said second element including formations which can slide into the two second grooves or the two third grooves to prevent said arms moving to said diverging relationship.

Said second element is preferably in the form of a channel having a web and two flanges at right angles to said web, said formations being lips extending along the free edges of the flanges and defining an elongate mouth affording access to the elongate internal cavity of the second element.

Each arm can be generally triangular in form, the first, second and third grooves of each arm each extending parallel to and inwardly of a respective edge of the arm. In this form each arm can include upstanding pairs of ribs on said first faces, each pair of ribs bounding one of said grooves.

The present invention also provides a display structure comprising first and second elements, a pair of arms and a plurality of display members, the first element including two spaced apart portions which together define a mouth, and each arm having a first face and an opposed second face, there being a transverse groove in each of said first faces adjacent one end thereof which grooves receive said portions when the arms are located in said mouth with the second of said opposed faces thereof in juxtaposed relationship, the distance between the bottom surfaces of said grooves being greater than the width of said mouth

- 3 -

between said portions before insertion of the arms therein so that said arms hold said portions apart, said one end of each arm being bounded by a rolling surface which merges with said second face of that arm, said rolling surfaces enabling said arms to roll one on the other between a position in which said second surfaces are in juxtaposed relationship and a position in which said rolling surfaces are in engagement with said arms diverging from said one end, said arms being inserted into and removed from said mouth while in this diverging relationship, said second element having an elongate internal cavity with a slot-like elongate entrance affording access to said cavity and said second element being attachable to the arms to prevent the arms from moving to said diverging relationship, said display members being receivable in said cavity by insertion into one of the ends of the cavity and each display member including a portion which protrudes from the cavity through said slot-like entrance.

In one form of this display structure each display member includes a slide receivable in said cavity and each protruding portion is in the form of a ball. In another form of display structure each display member includes a slide receivable in said cavity and each protruding portion is in the form of a hook. Said hooks can be shaped so as to abut one another when a series of them are inserted in said cavity, each co-operating pair of hooks forming a transverse aperture which is closed on all four sides.

- 4 -

The slot-like entrance of the second element is preferably bounded by lips which protrude towards one another from flanges of said second element.

In one constructional form said second element is generally H-shaped in cross-section and comprises two flanges and a cross-bar, there being an elongate internal cavity on each side of said cross-bar, and there being elongate slot-like entrances affording access to said cavities, each entrance being bounded by lips which protrude towards one another from said flanges.

The arms of the display structure can each have second and third grooves in each first face, the second and third grooves of each first face being oblique with respect to one another and said second element including formations which can slide into the two second grooves or the two third grooves to prevent said arms moving to said diverging relationship.

For a better understanding of the present invention reference will now be made, by way of example, to the accompanying drawings in which :-

Figure 1 is a side elevation of a shelf and display structure;

Figure 2 is a top plan view taken in the direction of the arrow A in Figure 1;

Figure 3 is a side elevation of a locking arm;

Figure 4 is a section on the line IV-IV of Figure 4;

Figure 5 is a section on the line V-V of Figure 1;

Figure 6 is a side elevation of a hook;  
Figure 7 is a front elevation of the hook  
of Figure 6;

Figure 8 is a side elevation of a knob  
structure;

Figure 9 is a top plan view of the  
structure of Figure 8;

Figure 10 is an end elevation of the  
structure of Figures 8 and 9;

Figure 11 is a side elevation of a  
further hook structure;

Figure 12 is an end view of one of the  
hooks of the hook structure of Figure 11; and

Figure 13 is a pictorial view of a shelf  
support.

Referring first to Figures 1 to 5, the  
shelf and display structure 10 illustrated  
comprises a vertical element 12, a plurality of  
locking arrangements 14.1, 14.2 and 14.3, a  
horizontal support member 16 and two sloping  
support members 18 and 20. The members 16, 18 and  
20 will not necessarily be used in the same shelf  
and display structure as one another and, for  
example, it would be more likely for there to be a  
series of horizontal support members 16 or a series  
of upwardly sloping support members 18 or a series  
of downwardly sloping support members 20. All  
three types of support member have been shown in  
conjunction with a single element 12 purely for the  
sake of illustration.

The element 12 can be in the form of an  
extrusion and comprises (see Figure 2) a web 22 and  
a pair of parallel, spaced flanges 24. The free  
extremities of the flanges 24 have lips 26

therealong which are directed towards one another and which bound the mouth leading to the internal cavity of the element 12.

Each locking arrangement 14.1, 14.2 and 14.3 comprises two arms 28 (see particularly Figures 3 and 4) which in side elevation are of triangular form. Each arm 28 has a flat inner face 30 and an outer face which is formed with three grooves 32, 34 and 36. The groove 32 is bounded by two ribs 38, the groove 34 is bounded by two ribs 40 and the groove 36 is bounded by two ribs 42. It will be noted that the groove 32 intersects both the groove 34 and the groove 36 and that part of one of the ribs 40 forms an end wall of the groove 36. Each arm 28 has, at one end thereof, a curved face 44 which merges smoothly with the face 30 and also merges with the bounding surface of the outermost rib 40.

One of each pair of arms 28 is formed with small protrusions and the other of each pair of arms has matching depressions. The matching depressions and protrusions indicated at 46 (see particularly Figure 2) prevent the arms 28 slipping with respect to one another while they are parallel with the faces 30 in contact. The matching protrusions and depressions indicated 48 and 50 only come into co-operating relationship during assembly or disassembly of the shelf and display structure (as will be described in more detail hereinafter) thus preventing relative vertical movement of these arms at this time.

The cross sectional shape of the groove 36 is illustrated in Figure 4 (this also being the

- 7 -

cross sectional shape of the groove 32) and the cross sectional shape of the groove 36 is best seen in Figure 2. It will be noted that in the case of the ribs 38 and 42, one rib of each pair is larger than the other.

The horizontal member 16 is generally H-shaped in cross-section (see Figure 5) and comprises two flanges 52 and 54 and a cross bar 56. The cross bar 56 is not centrally located with respect to the flanges 52 and 54 so that each flange projects further beyond the cross bar of one side thereof than on the other. Opposed lips 58 extend along two of the free edges of the flanges 52 and 54 and larger lips 60 extend along the other two free edges of the flanges 52 and 54. The lips 58 bound a slot-like mouth 62 leading to an elongate cavity 64 within the member 18. Likewise, the lips 60 form a slot-like mouth 66 leading into a second elongate cavity 68 within the member 18. It will be noted that the cavity 64 is substantially square in cross section and that the cavity 68 is narrow and slit-like. The lips 60 are shaped as shown for a purpose to be described. The members 18 and 20 are of the same cross-section as the member 16.

To assemble one of the locking arrangements 14.1, 14.2 or 14.3, the two arms 28 are placed back-to-back in a diverging relationship with the matching protrusions and depressions 48 and 50 in engagement. In this condition the effective width of the two arms 28 measured across the outermost of the ribs 40 is less than the width of the mouth bounded by the lips 26. The arms 28 thus enter the

- 8 -

elongate cavity of the element 12 and the outer ends of the arms 28 are then pressed towards one another, the faces 44 rolling on one another during this movement. Once the faces 30 are juxtaposed, one of the members 16, 18 or 20 is used to hold the arms together, the lips 58 entering the grooves 32 in the case of a horizontal support member 16 or the grooves 34 in the case of a sloping support member 18 or 20. It will be understood that the outermost ribs of the pairs of ribs 42 in the case of a sloping member 18 or 20 and the outermost ribs of the pairs of ribs 38 in the case of a horizontal member together with the adjacent parts of the arms 28 enter the cavity 64.

The distance between the lips 26 (when the element 12 is undefomed) is less than the effective width of the pair of arms 28 (measured between the flat floors of the grooves 34 when they are in the condition shown in Figure 2. Thus as the arms 28 are brought into their parallel relationship, the element 12 is deformed. More specifically, the flanges 24 are forced apart somewhat, this resulting in the lips 26 tightly gripping the arms 28. Any force tending to displace the locking arrangements 14.1, 14.2 or 14.3 along the element 12 is thus resisted by frictional contact between the lips 26 and the arms 28.

In Figure 1 there is shown a hook 70 and a knob 72. While these are illustrated in conjunction with the member 20 it will be understood that they can if desired also be associated with the members 16 and 18. It will also be understood

- 9 -

that only part of the length of each member 16, 18 and 20 has been shown and that, in practice, there will be a series of hooks 70 and/or a series of knobs 72 associated with each member.

Each hook 70 (see Figures 6 and 7) is cast integrally with a slide 74. The cross sectional shape of the slide 74 matches that of the cavity 64. Thus to mount a hook on the member 20, the slide 74 is inserted into that end of the cavity 64 which is remote from the element 12 and pushed along the member 20 to the desired position.

The knob 72 is constituted by a ball 76 cast integrally with a slide 78. The cross sectional shape of the slide 78 is such as to be compatible with cavity 68. A series of knobs 72 can be mounted on the member 20 by inserting the slides 78 into the cavity 68 from the end thereof remote from the element 12. It will be noted that the slide 78 includes a rib 80, the rib 80 being dimensioned so to fit in the elongate mouth 66.

In order to achieve the desired spacing between the knob 72, the slide 74 can initially include a portion 82 shown in chain dotted lines in Figure 9. The portion 82 is formed with a series of transverse weakening lines 84. By cutting or otherwise breaking the portion 82 along one of the weakened lines 84, the effective length of the slide 78 can be reduced thereby to decrease the spacing between adjacent knobs 72.

To cover and improve the appearance of the members 16, 18 and 20, end pieces of any suitable form can be used. Thus, in Figure 1, an

- 10 -

end piece 86 is shown in conjunction with the member 16. The end piece 86 is generally L-shaped and includes a portion the cross section of which is such as to enable it to slide into one of the cavities 64 or 68. The end piece 86 is a push fit in the respective cavity so that, while it can readily be removed, it will not be detached accidentally. In Figure 1 a further end piece 88 is shown fitted to the member 20. This end piece is in the form of a plug having a generally rectangular head from which a spigot protrudes. The spigot is of a cross sectional shape which is compatible with one of the cavities 64, 68, preferably the larger cavity 64.

In Figures 11 and 12 there is illustrated a modified form of hook, this hook being designated 90. The hook 90 includes a grooved bar 92 mounted by way of a column 94 on a slide 96. Two bosses 98 protrude on each side of the slide 96, the width of the slide measured across the bosses, and the cross sectional dimensions of the bosses being such that the slide 96 can be entered in the cavity 68. The provision of the bosses 98 reduces the area over which frictional contact between the slide and the bounding surfaces of the cavity 68 takes place.

The bar 92 is formed with a pointed nose 100 and the column 94 has a recess 102 therein.

To the right of the hook 90 shown, there is illustrated a part of a second hook 90.1. It will be seen that the nose 100 of the hook 90 enters the recess 102.1 and the slides 96 and 96.1 of the two hooks abut.

This particular form of hook is used by

- 11 -

mounting a first hook 90 on one of the members 18, 20 or 22 and then hanging a handbag or the like on the bar 92. The next hook 90 of the series is then mounted on the member 16, 18 or 20 so that the two hooks abut as shown in Figure 11. This then provides a transverse opening 106 which is closed on all sides and within which the handle of the handbag is trapped. By mounting a series of hooks of this form, and then suitably locking in position the last hook of the series, a theft proof display arrangement can be provided. Locking of the hooks in place can be achieved by means of a transverse hole in the respective member 16, 18 or 20 with some form of key operated or combination operated lock passed through the transverse hole.

Turning finally to Figure 13 a die cast or extruded shelf support 106 is shown which includes a horizontal web 108, a short depending flange 110 and a longer depending flange 112. The web 108 and flanges 110, 112 define a channel 114. A lip 116 extends along the inner face of the flange 110 and the shape of the components of the support 106 thus far described are such that the upper part of one of the flanges 52, 54 and one of the lips 60 (see Figure 2) will enter the channel 14. Engagement between the lip 116 and the shaped lip 60 prevents disengagement of the support 106 from the member 16 except by sliding movement to the end of the member 16.

A support arm 118 protrudes from the flange 112 and is formed in its outer end with an upwardly open groove 120. This groove serves to receive a resilient strip (not shown). Shelves (not shown) rest on the resilient strips which are

**0062980**

- 12 -

inserted in the grooves 120.

The element 12 is intended to be secured to a wall or other vertical surface. The element 12 can, however, be replaced by a free standing pole which has a series of pairs of lips 26 and a series of internal cavities. Thus members 16, 18 and 20 can be positioned so as to protrude radially in a number of different directions from the free standing pole.

CLAIMS

1. A structure comprising first (12) and second (16, 18, 20) elements and a pair of arms (28), the first element including two spaced apart portions (26) which together define a mouth, and each arm having a first face and an opposed second face (30), there being a first groove (34) in each first face adjacent one end thereof which grooves receive said portions when the arms are located in said mouth with the second of said opposed faces thereof in juxtaposed relationship, the distance between the bottom surfaces of said first grooves being greater than the width of said mouth between said portions before insertion of the arms therein so that said arms hold said portions apart, said one end of each arm being bounded by a rolling surface which merges with said second face, said rolling surfaces enabling said arms to roll one on the other between a position in which said second surfaces are in juxtaposed relationship and a position in which said rolling surfaces are in engagement with said arms diverging from said one end, said arms being inserted into and removed from said mouth while in this diverging relationship, characterized by second and third grooves (32, 36) in each first face, the second and third grooves (32, 36) of each first face being oblique with respect to one another and said second element (16, 18, 20) including formations (60) which can slide into the two second grooves (32) or the two third grooves (36) to prevent said arms moving to said diverging relationship.

- 14 -

2. A structure according to claim 1, characterized in that said second element (16, 18, 20) is in the form of a channel having a web (56) and two flanges (52, 54) at right angles to said web, said formations (60) being lips extending along the free edges of the flanges (54) and defining an elongate mouth (66) affording access to the elongate internal cavity (68) of the second element.

3. A structure according to claim 1 or 2, characterized in that each arm (28) is generally triangular in form, the first, second and third grooves of each arm each extending parallel to and inwardly of a respective edge of the arm.

4. A structure according to claim 3, characterized in that each arm includes upstanding pairs of ribs (38, 40, 42) on said first faces, each pair of ribs bounding one of said grooves.

5. A structure comprising first (12) and second elements (16, 18, 20), and a pair of arms (28), the first element including two spaced apart portions (26) which together define a mouth, and each arm having a first face and an opposed second face (30), there being a transverse groove (34) in each of said first faces adjacent one end thereof which grooves receive said portions when the arms are located in said mouth with the second of said opposed faces thereof in juxtaposed relationship, the distance between the bottom surfaces of said grooves being greater than the width of said mouth between said portions before insertion of the arms therein so that said arms hold said portions apart,

said one end of each arm being bounded by a rolling surface (44) which merges with said second face (30) of that arm, said rolling surfaces enabling said arms to roll one on the other between a position in which said second surfaces are surfaces are in juxtaposed relationship and a position in which said rolling surfaces are in engagement with said arms diverging from said one end, said arms being inserted into and removed from said mouth while in this diverging relationship, said second element (16, 18, 20) having an elongate internal cavity (68) with a slot-like elongate entrance (66) affording access to said cavity and said second element being attachable to the arms (28) to prevent the arms from moving to said diverging relationship, there being display members (70, 72, 90) being receivable in said cavity by insertion into one of the ends of the cavity and each display member including a portion which protrudes from the cavity through said slot-like entrance.

6. A structure according to claim 5, characterized in that each display member includes a slide (78) receivable in said cavity and in which each protruding portion is in the form of a ball (72).

7. A structure according to claim 5, characterized in that each display member (70, 90) includes a slide (74, 96) receivable in said cavity and in which said protruding portion is in the form of a hook.

8. A structure according to claim 7, characterized in that said hooks are shaped so as to

abut one another when a series of them are inserted in said cavity, each co-operating pair of hooks forming a transverse aperture which is closed on all four sides.

9. A structure according to claims 5 to 8, characterized in that said slot-like entrance (66) is bounded by lips (60) which protrude towards one another from flanges (54) of said second element.

10. A structure according to claims 5 to 8, characterized in that said second element (16, 18, 20) is generally H-shaped in cross-section and comprises two flanges (54) and a cross-bar (56), there being an elongate internal cavity (64, 68) on each side of said cross-bar (54), and there being elongate slot-like entrances (62, 66) affording access to said cavities (64, 68), each entrance being bounded by lips (58, 60) which protrude towards one another from said flanges.

11. A structure according to claims 5 to 10, characterized in that there are second and third grooves (34, 36) in each first face, the second and third grooves of each first face being oblique with respect to one another and said second element including formations which can slide into the two second grooves or the two third grooves to prevent said arms moving to said diverging relationship.

0062980

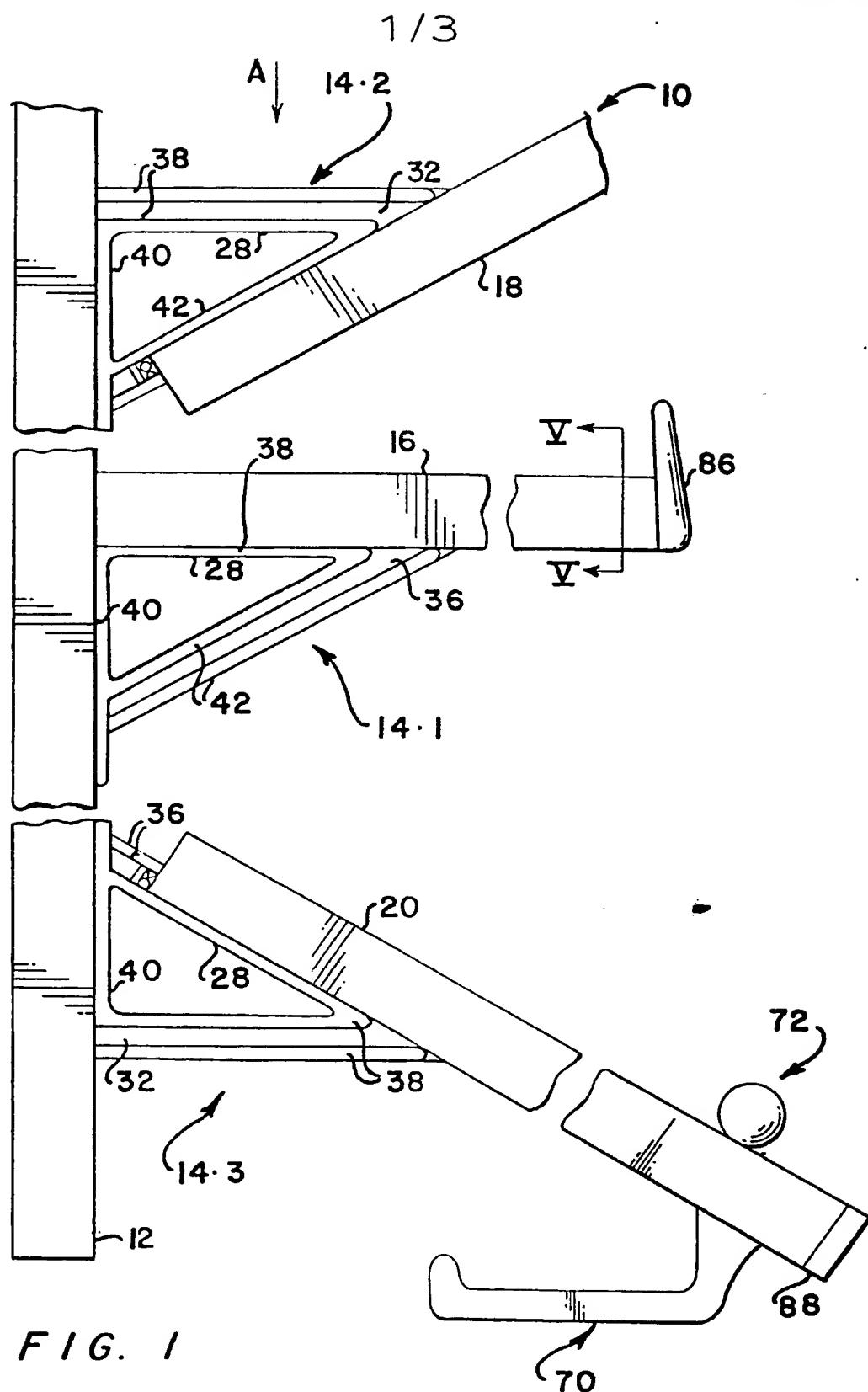


FIG. 1

0062980

2 / 3

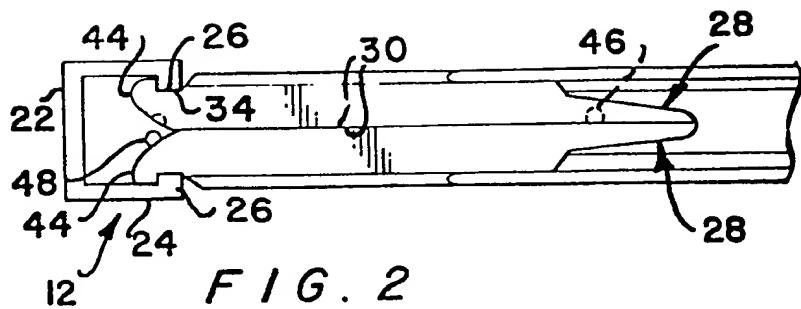


FIG. 2

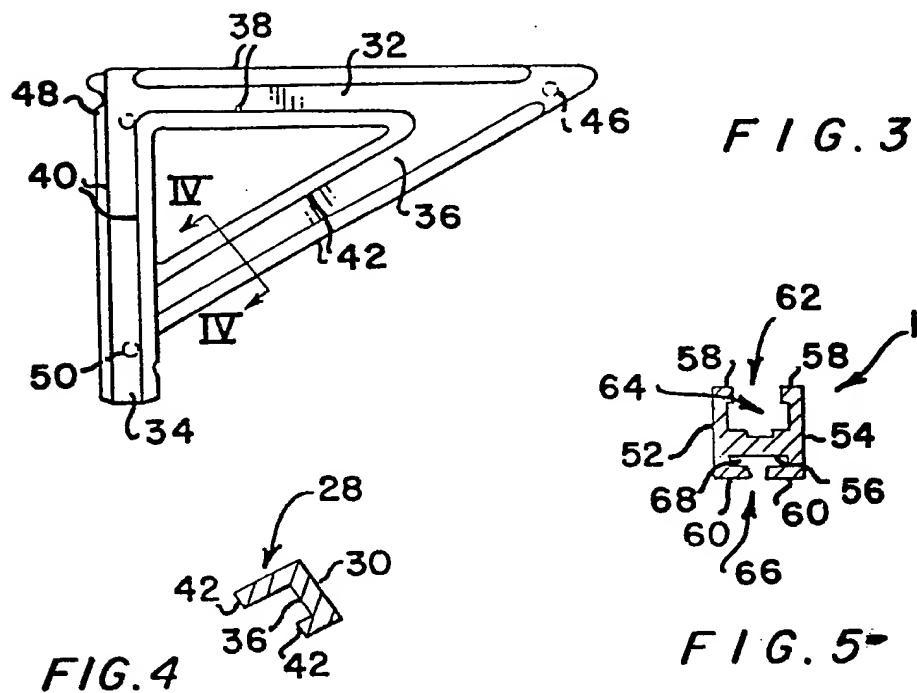


FIG. 3

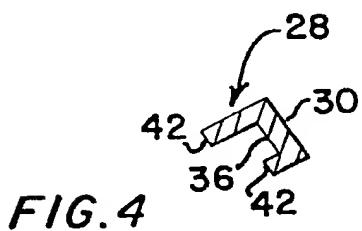


FIG. 4

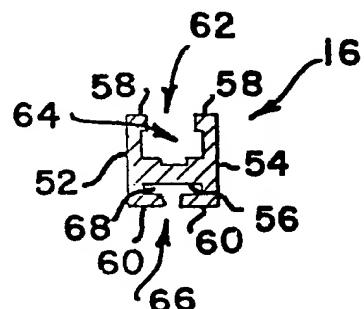


FIG. 5-

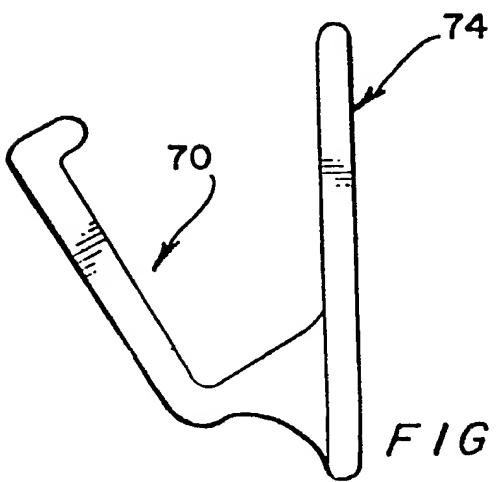


FIG. 6

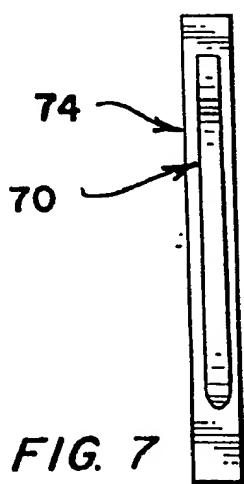


FIG. 7

0062980

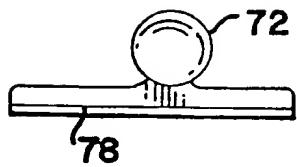


FIG. 8

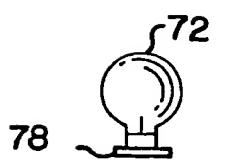
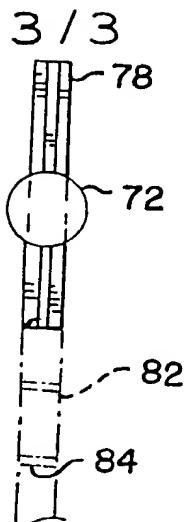


FIG. 10

FIG. 9

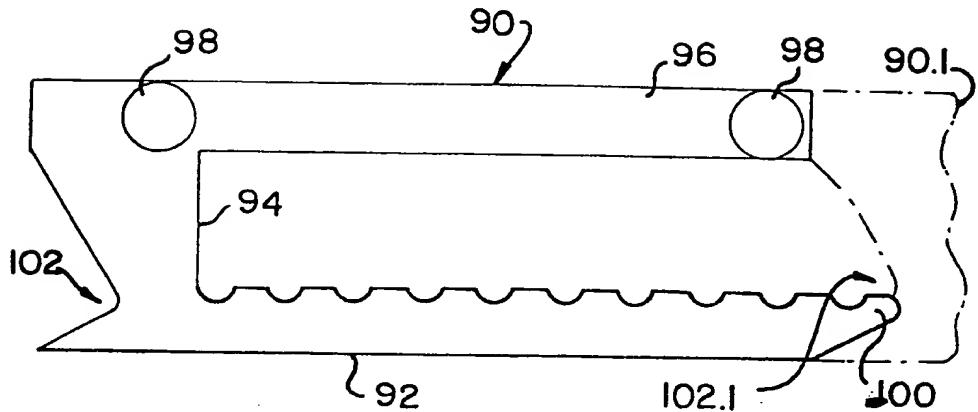


FIG. 11

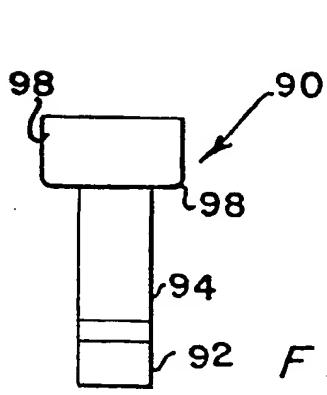


FIG. 12

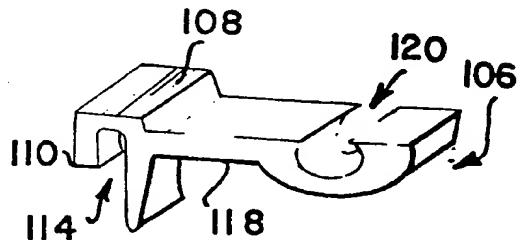


FIG. 13



European Patent  
Office

EUROPEAN SEARCH REPORT

0062980

Application number

EP 82 30 1478

DOCUMENTS CONSIDERED TO BE RELEVANT			CLASSIFICATION OF THE APPLICATION (Int. Cl. 3)
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	
Y	US-A-4 207 014 (WORRALLO) *Figures 1-4*	1-4	A 47 B 57/04 A 47 B 57/56
A	---	5	
Y	FR-A-2 354 073 (WORRALLO) *Figures 6-12; page 6, lines 24-39* & US - A - 4 146 343	1-4	
A	---	5,9-11	
Y	GB-A- 865 101 (RENDERS) *Figures 1-11*	1-4	
A	---	5	
A	US-A-3 669 479 (PAYNE) *Figure 2*	1-4	
A	---		A 47 B F 16 B
A	US-A-3 563 626 (FERDINAND et al.) *Figures 17-22*		
A	US-A-2 767 950 (BELLON et al.) *Figure 1*		
	-----		
The present search report has been drawn up for all claims			
Place of search	Date of completion of the search	Examiner	
THE HAGUE	20-07-1982	CURZI D.	
CATEGORY OF CITED DOCUMENTS		T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document	
X : particularly relevant if taken alone			
Y : particularly relevant if combined with another document of the same category			
A : technological background			
O : non-written disclosure			
P : intermediate document			